

THAT WHICH IS CLAIMED IS:

1. A geminivirus silencing vector comprising a geminivirus genome which contains heterologous DNA, said heterologous DNA having substantial sequence similarity to a gene endogenous to a plant.

2. A vector according to claim 1, wherein said heterologous DNA replaces a segment of the coding sequence for the geminivirus coat protein.

3. A vector according to claim 1, wherein said heterologous DNA is operably associated with a promoter.

4. A DNA construct according to claim 3, wherein said promoter is the promoter that is associated with said endogenous plant gene.

5. A DNA construct according to claim 3, wherein said promoter is the geminivirus coat protein promoter.

6. A vector according to claim 1, wherein said heterologous DNA is in sense orientation.

7. A vector according to claim 1, wherein said heterologous DNA is in antisense orientation.

8. A vector according to claim 1, wherein said heterologous DNA has substantial sequence similarity to a fragment of said endogenous plant gene.

9. A vector according to claim 1, wherein said heterologous DNA has substantial sequence similarity to the entire coding region of endogenous plant gene.

10. A vector according to claim 1, wherein said geminivirus genome is selected from the group consisting of Tomato Golden Mosaic Virus (TGMV) and African Cassava Mosaic Virus (ACMV).

11. The vector of claim 1, wherein expression of said heterologous DNA modifies an observable plant phenotypic trait.

12. A DNA construct comprising a geminivirus genome, wherein the DNA encoding the geminivirus coat protein has been replaced in part or in total with heterologous DNA having substantial sequence similarity to an endogenous plant gene.

13. A DNA construct according to claim 12, wherein said heterologous DNA is operably associated with a promoter.

14. A DNA construct according to claim 13, wherein said promoter is the promoter that is associated with said endogenous plant gene.

15. A DNA construct according to claim 13, wherein said promoter is the geminivirus coat protein promoter.

16. A DNA construct according to claim 12, wherein said heterologous DNA is in sense orientation.

17. A vector according to claim 12, wherein said heterologous DNA is in antisense orientation.

18. A vector according to claim 12, wherein said heterologous DNA has substantial sequence similarity to a fragment of said endogenous plant gene.

19. A vector according to claim 12, wherein said heterologous DNA has substantial sequence similarity to the entire coding region of endogenous plant gene.

20. A vector according to claim 12, wherein said geminivirus genome is selected from the group consisting of Tomato Golden Mosaic Virus (TGMV) and African Cassava Mosaic Virus (ACMV).

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21. The vector of claim 12, wherein expression of said heterologous DNA modifies an observable plant phenotypic trait.

22. A DNA construct comprising, in the 5' to 3' direction, a geminivirus origin of replication; DNA encoding proteins necessary for replication of said DNA construct; and a heterologous DNA segment having substantial sequence similarity to an endogenous plant gene.

23. A DNA construct comprising, in the 5' to 3' direction, a geminivirus origin of replication; DNA encoding proteins necessary for replication of said DNA construct; and a heterologous DNA segment having substantial sequence similarity to an endogenous plant gene, subject to the proviso that said DNA
5 segment is not operably linked to a promoter.

24. A DNA construct according to claim 22 or 23, further comprising at least one copy of a geminivirus DNA-B component.

25. A DNA construct according to claim 22 or 23, further comprising a transcription termination region located 3' to said heterologous DNA.

26. A DNA construct according to claim 22, further comprising a promoter operably linked to said DNA segment.

27. A DNA construct according to claim 26, wherein said promoter is the geminivirus AR1 promoter.

28. A DNA construct according to claim 26, wherein said promoter is the promoter that is associated with said endogenous plant gene.

29. A DNA construct according to claim 22 or 23, wherein said DNA segment is in sense orientation.

30. A DNA construct according to claim 22 or 23, wherein said DNA segment is in antisense orientation.

31. A plant cell comprising a geminivirus silencing vector according to claim 1, 12, 22, 23 or 24.

32. A plant comprising a plurality of plant cells according to claim 31.

33. A method of silencing the expression of a plant gene in a plant cell, comprising inoculating said plant cell with a vector according to claim 1, 12, 22, 23 or 24.

34. A method of systemically silencing expression of a plant gene in a plant, comprising inoculating said plant with a vector according to claim 1, 12, 22, 23 or 24.

35. A method of screening isolated plant DNA for function, comprising:
preparing a vector according to claim 1, 12, 22, 23 or 24, wherein said heterologous DNA of the vector has substantial sequence similarity to said isolated DNA;

5 inoculating a plant with said vector;
 comparing said inoculated plant to a control plant;
wherein differences between the inoculated and control plant indicate the function of the isolated plant DNA.

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